

WHAT IS CLAIMED IS:

1. An organic electroluminescent device comprising:
 - a) an anode;
 - b) a hole-transporting region disposed over the anode; wherein the hole-transporting region contains at least one hole-transporting material;
 - c) a metal sub-layer disposed within the hole-transporting region; wherein the metal sub-layer contains at least one metal selected from group 4 through group 16 of the Periodic Table of Elements and the selected metal has a work-function higher than 4.0 eV;
 - d) a light-emitting layer formed in contact with the hole-transporting region for producing light in response to hole-electron recombination;
 - e) an electron-transporting layer disposed over the light-emitting layer; and
 - f) a cathode disposed over the electron-transporting layer.
2. The organic electroluminescent device of claim 1 wherein the thickness of the metal sub-layer is less than 10 nm.
3. The organic electroluminescent device of claim 1 wherein the thickness of the metal sub-layer is less than 1 nm.
4. The organic electroluminescent device of claim 1 wherein the distance between the metal sub-layer and the light-emitting layer is in the range of from 2 nm to 30 nm.
5. The organic electroluminescent device of claim 1 wherein the distance between the metal sub-layer and the light-emitting layer is in the range of from 5 nm to 20 nm.
6. The organic electroluminescent device of claim 1 wherein the metal sub-layer includes at least one metal including Al, Ti, V, Cr, Fe, Co, Ni, Cu, Zn, Ga, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, Ta, W, Re, Os, Ir, Pt, Au or Pb.

7. The organic electroluminescent device of claim 1 wherein the metal sub-layer includes at least one metal including Al, Ni, Cu, Zn, Ga, Mo, Pd, Ag, In, Sn, Pt or Au.

8. The organic electroluminescent device of claim 1 wherein the metal sub-layer includes at least one metal including Al, Cu, Ag or Au.

9. The organic electroluminescent device of claim 1 wherein the hole-transporting region containing at least one hole-transporting material including aromatic tertiary amines.

10. The organic electroluminescent device of claim 1 wherein the hole-transporting region containing at least one hole-transporting material including polycyclic aromatic compounds.

11. The organic electroluminescent device of claim 1 wherein the hole-transporting region containing at least one hole-transporting material selected from NPB or TNB.